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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,279	02/05/2008	Naoki Hatta	133.0014 (F-2026US)	2841
27997 7590 06/08/2011 PRIEST & GOLDSTEIN PLLC 5015 SOUTHPARK DRIVE SUITE 230 DURHAM, NC 27713-7736			EXAMINER WEINER, LAURA S	
			ART UNIT 1726	PAPER NUMBER
			MAIL DATE 06/08/2011	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,279	<b>Applicant(s)</b> HATTA ET AL.	
	<b>Examiner</b> /Laura Weiner/	<b>Art Unit</b> 1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-7,9,10 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-7,9,10 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-2, 4-5, 10 in the reply filed on 1-10-2011 is acknowledged. The restriction has been withdrawn. Applicant's election of species of a cathode comprising  $\text{LiFePO}_4$  where V and a halogen element is present has been examined and was not found. Therefore the species searched was  $\text{LiFePO}_4$  with Ti or Cu or V, or Cr or Zn and F or Cl.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 4-7, 9-10, and 14 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

3. Claims 1, 4-7, 9-10 and 14 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the cathode material to contain Cl, does not reasonably provide enablement for any halogen element. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification only shows/describes using only Cl as the halogen element and no other halogen element.

4. Claims 1, 4-7, 9-10,14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 4 and 6 are rejected because it is unclear what is meant by “and in a molar concentration of up to twice that of the metal element or elements”. There seems to be no upper limit to the range of the halogen element present. It is unclear if this would give the upper limit of the range cited as “a halogen element in an amount of 0.1 mol% or more based on P and in a molar concentration of up to twice that of the metal element or elements”. It is unclear how one or more metal elements ( $M_x$  or  $M_{1-x}$ ) can be present in a range of 0.1 to 5 mol% in terms of element ratio based on iron because the formula  $LiFePO_4$  only allows for  $Fe_1$  and not  $Fe_x$  or  $Fe_{1-x}$  for example and therefore not allowing for  $LiFe_xM_{1-x}PO_4H$  or  $LiFe_{1-x}M_xPO_4H$ . It is also unclear how a halogen element ( $H_y$  or  $H_{1-y}$ ) can be present in an amount of 0.1 mol% or more based on P because the formula  $LiFePO_4$  only allows for  $PO_4_1$  and not  $PO_4_y$  or  $PO_{4(1-y)}$  for example and therefore not allowing for  $LiFe_xM_{1-x}(PO_4)_yH_{1-y}$  or  $LiFe_{1-x}M_x(PO_4)_{1-y}H_y$ . This makes the claims vague and indefinite.

### ***Drawings***

5. The drawings are objected to because newly added Figures 1 and 2 submitted on 4-25-2011 are not described in the specification. In addition, Figures 1 and 2 as well as Figures 3-26 are already present which were submitted on 4-25-2006. Corrected

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drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

6. The disclosure is objected to because of the following informalities:  
Figures 1-26 filed on 4-25-2006 and Figures 1-2 filed on 5-3-2011 are not each described in the specification. In addition, each are not cited in the section entitled "BRIEF DESCRIPTION OF THE DRAWINGS".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

7. Claims 1, 6 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Barker et al. (6,777,132).

Barker et al. teaches an electrode having the formula  $AaMb(XY_4)_cZ_d$ , where A is an alkali metal and a can equal 1; M is a metal capable of undergoing oxidation to a higher valence state and b can be 1-3;  $XY_4$  can be  $PO_4$  and c can be greater than 0 but less than or equal to 3; and Z can be a halogen and d is greater than 0 but less than or equal to 6. Barker et al. teaches in column 6, lines 43-55, that Z can be F, Cl, Br, etc. Barker et al. teaches in column 10, line 26,  $Li_4FeV(PO_4)Br$ ; in line 39,  $Li_5TiFe(PO_4)_3F$ ; line 42,  $Li_4Ti_{0.75}Fe_{1.5}(PO_4)_3F$ ; etc. Barker et al. teaches in claim 9, that M can be Fe, Ti, Cu, V, Cr, etc. and mixtures thereof and teaches in claims 10-13, that M is  $M'M''$  where  $M'$  can be Fe, Cu, V, Ti, Cr, etc. and mixtures thereof and that  $M''$  can be Zn. The claims are anticipated when the formula is  $Li(FeZn)_b(PO_4)_cFd$  or  $Li(FeZn)_b(PO_4)_cCl_d$  or  $Li(FeZn)_b(PO_4)_cBr_d$ .

***Claim Rejections - 35 USC § 103***

8. Claims 1, 4, 6 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Barker et al. (6,777,132).

Barker et al. teaches an electrode having the formula  $AaMb(XY_4)_cZ_d$ , where A is an alkali metal and a can equal 1; M is a metal capable of undergoing oxidation to a higher valence state and b can be 1-3;  $XY_4$  can be  $PO_4$  and c can be greater than 0 but

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less than or equal to 3; and Z can be a halogen and d is greater than 0 but less than or equal to 6. Barker et al. teaches in column 6, lines 43-55, that Z can be F, Cl, Br, etc.

Barker et al. teaches in column 10, line 26,  $\text{Li}_4\text{FeV}(\text{PO}_4)\text{Br}$ ; in line 39,  $\text{Li}_5\text{TiFe}(\text{PO}_4)_3\text{F}$ ; line 42,  $\text{Li}_4\text{Ti}_{0.75}\text{Fe}_{1.5}(\text{PO}_4)_3\text{F}$ ; etc. Barker et al. teaches in claim 9, that M can be Fe, Ti, Cu, V, Cr, etc. and mixtures thereof and teaches in claims 10-13, that M is  $\text{M}'\text{M}''$  where  $\text{M}'$  can be Fe, Cu, V, Ti, Cr, etc. and mixtures thereof and that  $\text{M}''$  can be Zn.

The claims are anticipated when the formula is  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Fd}$  or

$\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Cl d}$  or  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Br d}$ .

In the event any differences can be shown for the product of the product by process claim 4, as opposed to the product taught by Barker et al., such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results. *In re Thrope* 227 USPQ 964; (Fed. Cir. 1985).

With respect to the product by process claim 4, the determination of patentability is based upon the product itself not upon the method of its production. *In re Thrope* 227 USPQ 964; *In re Brown* 173 USPQ 685; *In re Bridgeford* 149 USPQ 55; *In re Wertheim* 191 USPQ 90. Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the Examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the Applicants to establish that their product is patentably distinct. *In re Brown* 173 USPQ 685 and *In re Fessmann* 180 USPQ 324.

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When the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or 103 of the statute is appropriate. As a practical matter, the Patent and Trademark Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith. A lesser burden of proof is required to make out a case of prima facie obviousness for product-by-process claims because of their particular nature than when a product is claimed in the conventional fashion. *In re Brown*, 59 CCPA 1063, 173 USPQ 685 (1972); *In re Fessmann*, 180 USPQ 324 (CCPA 1974).

9. Claims 1, 4, 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (6,777,132).

Barker et al. teaches an electrode having the formula  $AaMb(XY_4)_cZ_d$ , where A is an alkali metal and a can equal 1; M is a metal capable of undergoing oxidation to a higher valence state and b can be 1-3;  $XY_4$  can be  $PO_4$  and c can be greater than 0 but less than or equal to 3; and Z can be a halogen and d is greater than 0 but less than or equal to 6. Barker et al. teaches in column 6, lines 43-55, that Z can be F, Cl, Br, etc. Barker et al. teaches in column 10, line 26,  $Li_4FeV(PO_4)Br$ ; in line 39,  $Li_5TiFe(PO_4)_3F$ ; line 42,  $Li_4Ti_{0.75}Fe_{1.5}(PO_4)_3F$ ; etc. Barker et al. teaches in claim 9, that M can be Fe, Ti, Cu, V, Cr, etc. and mixtures thereof and teaches in claims 10-13, that M can also be  $M'M''$  where  $M'$  can be Fe, Cu, V, Ti, Cr, etc. and mixtures thereof and that  $M''$  can be



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Zn. Thus teaching the formula can be  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c$  or  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Cl}$  or  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Br}$ .

Barker et al. discloses the claimed invention except for specifically teaching that M can be Fe with Ti or Cu or V or Cr or Zn.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Fe and Ti; or Fe and Cu; or Fe and V; or Fe and Cr; or Fe and Zn in the formula,  $\text{LiFePO}_4$  taught by Barker et al. because it is prima facie obvious to combine two compositions each of which is taught by prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose. See *In re Kerkhoven*, 205 USPQ 1069; *In re Susi*, 169 USPQ 423.

10. Claims 1, 4-6 and 9-10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (6,777,132) in view of Ravet et al. (6,855,273).

Barker et al. teaches an electrode having the formula  $\text{AaMb}(\text{XY}_4)_c\text{Zd}$ , where A is an alkali metal and a can equal 1; M is a metal capable of undergoing oxidation to a higher valence state and b can be 1-3;  $\text{XY}_4$  can be  $\text{PO}_4$  and c can be greater than 0 but less than or equal to 3; and Z can be a halogen and d is greater than 0 but less than or equal to 6. Barker et al. teaches in column 6, lines 43-55, that Z can be F, Cl, Br, etc. Barker et al. teaches in column 10, line 26,  $\text{Li}_4\text{FeV}(\text{PO}_4)\text{Br}$ ; in line 39,  $\text{Li}_5\text{TiFe}(\text{PO}_4)_3\text{F}$ ; line 42,  $\text{Li}_4\text{Ti}_{0.75}\text{Fe}_{1.5}(\text{PO}_4)_3\text{F}$ ; etc. Barker et al. teaches in claim 9, that M can be Fe, Ti, Cu, V, Cr, etc. and mixtures thereof and teaches in claims 10-13, that M is  $\text{M}'\text{M}''$  where  $\text{M}'$  can be Fe, Cu, V, Ti, Cr, etc. and mixtures thereof and that  $\text{M}''$  can be Zn.

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The claims are anticipated when the formula is  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Fd}$  or  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Id}$  or  $\text{Li}(\text{FeZn})_b(\text{PO}_4)_c\text{Brd}$ .

Barker et al. discloses the claimed invention except for specifically teaching that the cathode material comprises a conductive carbon deposited on the surface.

Revet et al. teaches in column 8, Example 1, a cathode comprising  $\text{LiFePO}_4$  is coated with a carbonaceous material. Revet et al. teaches in column 4, lines 25-45, that the improvement of the conductivity at the surface of the particles obtained with the carbonaceous material coating allows satisfactory operations of electrodes containing electroactive materials having an insufficient electronic conductivity to obtain acceptable performance. Revet et al. teaches in columns 3-4, that the cathode has the general formula  $\text{AaMmZzOoNnFf}$  where A is Li, M is at least one transition metal such as Fe, vanadium, titanium, molybdenum, tungsten,  $z=0$ ,  $n=0$  and F is fluorine.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to coating the cathode material with a conductive carbon taught by Revet et al. because Revet et al. teaches that the improvement of the conductivity at the surface of the particles obtained with the carbonaceous material coating allows satisfactory operations of electrodes containing electroactive materials having an insufficient electronic conductivity to obtain acceptable performance.

### ***Conclusion***

**11. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Laura Weiner/ whose telephone number is (571)272-1294. The examiner can normally be reached on M-H (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura Weiner/  
Primary Examiner  
Art Unit 1726

June 2, 2011